

EXTERNAL HARD DISKS

INTRODUCTION

Hard disks that once seemed to offer huge amounts of storage space can fill up worryingly quickly, especially if you have an ever-increasing collection of music and videos. Replacing or adding a hard disk to a desktop PC is fairly simple, but it isn't an option if you need to transfer files between two computers. If you use a notebook PC, replacing the internal hard disk can be very difficult.

External hard disks are a cheap, fast and convenient way of adding extra storage. They're also great for backing up your data. If you take your external hard disk away, you can salvage your data even if your PC is stolen or damaged by fire or flood.

This month we've tested 12 external hard disks. Six are portable devices ideal for use with a notebook, and six are desktop models that hold a huge amount of data. Whatever you need to store, we'll help you find a disk that's fast and great value.

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THINK OUTSIDE THE BOX

An external hard disk is ideal for backing up data, moving files between PCs or simply adding storage space to a groaning PC. We take 12 disks for a spin

Choosing an... External Hard Disk

When choosing an external hard disk, it's tempting simply to buy the cheapest and largest one available, but this can leave you with a product that's slow and frustrating to use. Before you buy it pays to consider whether you want a portable disk, what interfaces you'll need, how much storage you want and if you want any backup software.

THE BIG ISSUE

There are two types of external hard disk: those made for use on a desk and those that are built for portability. Desktop external hard disks have the highest capacities and the lowest cost per gigabyte. They require an external power supply, but this shouldn't be a problem if they spend most of their time sitting next to your PC.

If you need to carry a disk with you, or you want to transfer files from one PC to another, look for a portable disk. These are based on notebook hard disks and so are smaller and lighter, but they're not as spacious or as cheap as their desktop counterparts.

Portable hard disks don't need an external power adaptor, but some need to be connected to two USB ports using a special cable that provides enough power. FireWire portable disks draw all the power they need from the FireWire port.

NEVERENDING STORAGE

With a few exceptions, all the desktop disks tested in this month's Labs provide 500GB of space, and all the portable disks have 160GB. Most models are available in a range of sizes, though, so we've listed these in the tables on pages 84 and 85. We've also listed the cost per gigabyte of each disk, making it easy to see which are good value and which are more expensive.

ANY PORT IN A STORM

Many external hard disks offer a choice of interfaces. USB Hi-Speed interfaces are by far the most common, and are designed to connect to USB2 ports on your PC. All PCs made in the past few years should have at least two USB2 ports. If you need to connect more than one USB hard disk, you can buy a four-port USB2 hub for around £15. If your notebook or PC has no USB ports, or only has slower USB 1.1 ports, you could buy a USB2 PCI expansion card for around £20. You may even have spare USB2 header connections on your motherboard, in which case a £5 bracket will allow you to use them.

USB Hi-Speed is quick enough for everyday tasks, but if you regularly copy huge files, such as DV or HD video, you may want an even faster interface. Budget for an adaptor if you don't have the necessary ports.





This month

PORTABLE EXTERNAL HARD DISKS LACIE Rugged All-Terrain Hard Drive 100GB 7200rpm Page 84
WESTERN DIGITAL Passport Portable (Black) 160GB USB 2.0 Hard Drive Page 84
FORMAC disk mini USB 2.0 160GB Page 84
FRECOM Mobile Drive 2.5in 160GB USB 2.0 Page 84
MAXTOR OneTouch III Mini Edition 160GB Page 84
SEAGATE FreeAgent Go USB 2.0 160 GB Page 84
DESKTOP EXTERNAL HARD DISKS WESTERN DIGITAL My Book Premium ES Edition 500GB Page 85
BUFFALO DriveStation Combo 500GB Page 85
LACIE d2 eSATA II 3Gbits Hard Drive 500GB Page 85
PACKARD BELL Store & Save 3500 Page 85
FRECOM Hard Drive PRO 3.5in USB 2.0 & FireWire 500GB Page 85
SEAGATE FreeAgent Pro 750-GB External Hard Drive Page 85

Many new PCs and notebooks come with FireWire 400 ports – also known as IEEE-1394a or iLink. In theory, FireWire 400 is slower than USB Hi-Speed, but FireWire 400 hard disks tend to be faster. If your PC doesn't have FireWire 400, you can add a PCI or CardBus adaptor for around £20. Most notebooks use smaller four-pin FireWire ports, so you may need a four-to-six-pin FireWire cable. These cost as little as £6.

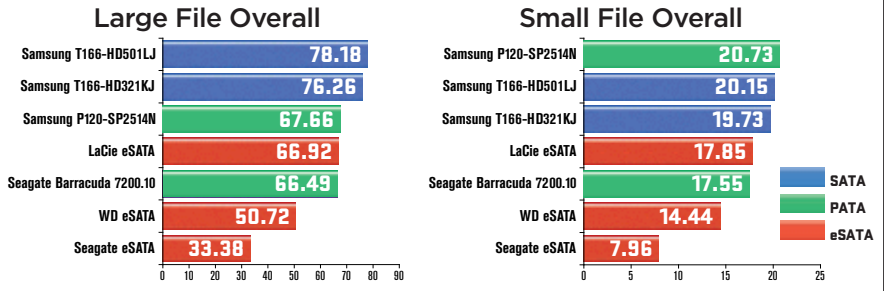
FireWire 800, also known as IEEE-1394b, is even faster than FireWire 400 and, as some of our tests show, can approach the speed of theoretically faster eSATA hard disks. Sadly, few hard disks, and even fewer PCs, have FireWire 800 ports. A FireWire 800 PCI card costs around £35, a CardBus card costs around £40 and an ExpressCard adaptor costs around £60. FireWire 400 disks can plug into a FireWire 800 port using an adaptor cable that costs around £7.

Finally, eSATA is the external version of the SATA II interface that internal hard disks use. eSATA can be significantly faster than USB and FireWire, and in some cases approaches the speeds of internal SATA disks. An increasing number of PCs come with a built-in eSATA port, but if you want to add more eSATA disks, you'll need more ports. The easiest and cheapest way to add more is to buy a £12 PCI backplate that allows you to connect an eSATA disk to one of the internal SATA ports on your motherboard. If you don't want to occupy an internal SATA port,

Spin doctors How eSATA disk speeds stack up

eSATA is the external version of the SATA II interface for internal hard disks. On paper eSATA hard disks are as fast as SATA II disks, but our tests show that this isn't always true. Only LaCie's d2 neared the speed of our SATA hard disk Labs winners, Samsung's 320GB T166-HD321KJ and 500GB T166-HD501LJ.

Western Digital's My Book Premium ES Edition and Seagate's FreeAgent Pro couldn't even keep up with our internal hard disk Labs winners that use the older PATA interface. The Samsung 250GB P120-SP2514N and Seagate 500GB Barracuda 7200.10 should in theory be slower than all the SATA and eSATA disks.



a two-port LaCie eSATA PCI-E card costs around £30. A CardBus adaptor costs about £45.

SOFT SELL
External hard disks are great for storing backup data, and if you don't already have some backup software, you should consider the applications that are included with many disks. Backup software should support scheduled backups so

that you don't have to remember to copy your files manually. It should also keep older versions of your files in case you delete something you shouldn't, and support incremental backups so only those files that have changed since your last backup are copied. Most backup applications included with these disks are useful, but LaCie's Backup Software and the Seagate tools included with the FreeAgent Pro lack these vital features.

EXTERNAL HARD DISKS

PORTABLE EXTERNAL HARD DISKS



MANUFACTURER	LACIE	WESTERN DIGITAL	FORMAC	FREECOM	MAXTOR	SEAGATE
Model	Rugged All-Terrain Hard Drive 100GB 7200rpm	Passport Portable (Black) 160GB USB 2.0 Hard Drive	disk mini USB 2.0 160GB	Mobile Drive 2.5in 160GB USB 2.0	OneTouch III Mini Edition 160GB	FreeAgent Go USB 2.0 160GB
Rating	★★★	★★★★★	★★★★	★★★	★★★★	★★★
STORAGE						
Hard disk	Hitachi Travelstar 7K100 HTS72101 0G9AT00	Western Digital Scorpio WD1600BEVE	Hitachi Travelstar 5K160	Samsung SpinPoint M80-HM160JC	Seagate Momentus 5400.3 Ultra ATA/100 160-GB Hard Drive ST9160821A-RK	Seagate Momentus 5400.3 Ultra ATA/100 160-GB Hard Drive ST9160821A-RK
Capacity	100GB	160GB	160GB	160GB	160GB	160GB
Formatted capacity (NTFS)	93GB	149GB	149GB	149GB	149GB	149GB
Price per gigabyte	£1.33	£0.47	£0.48	£0.53	£0.58	£0.61
Disk size	2.5in	2.5in	2.5in	2.5in	2.5in	2.5in
Interface	USB Hi-Speed, FireWire 400, FireWire 800	USB Hi-Speed	USB Hi-Speed	USB Hi-Speed	USB Hi-Speed	USB Hi-Speed
Power connector	USB from host, FireWire from host	USB from host	USB from host	USB from host	USB from host	USB from host
Spindle speed	7,200rpm	5,400rpm	5,400rpm	5,400rpm	5,400rpm	5,400rpm
Cache	8MB	8MB	8MB	8MB	8MB	8MB
Quoted seek time	12.0ms	12.0ms	11.0ms	12.0ms	9.0ms	13.0ms
HD Tach access time	16.3ms	17.3ms	18.4ms	18.3ms	16.9ms	16.1ms
Weight	262g	156g	220g	288g	208g	178g
Dimensions (HxWxD)	35x101x151mm	25x86x135mm	28x97x136mm	29x82x141mm	21x98x140mm	28x106x130mm
BUYING INFORMATION						
Capacities available	100GB, 120GB, 160GB	60GB, 80GB, 120GB, 160GB, 250GB	80GB, 120GB, 160GB, 200GB	40GB, 80GB, 120GB, 160GB	80GB, 120GB, 160GB	80GB, 120GB, 160GB
Bundled backup software	LaCie Backup Software 1.5.2042.25505	EMC Retrospect Express HD 2.0	None	Freecom Backup Software 2.08, Freecom Personal Media Suite 2.5.1.1	Maxtor EasyManage 4.1.0.12	Ceedo 2.1.0.12, Seagate FreeAgent Tools 1.0.1.14
Price including VAT	£123 inc VAT	£70 inc VAT	£71 inc VAT	£79 inc VAT	£87 inc VAT	£91 inc VAT
Warranty	Two years	Two years	Two years	Two years	Two years	Five years
Supplier	www.cancomuk.com	www.amazon.co.uk	www.dabs.com	www.dabs.com	www.scan.co.uk	www.scan.co.uk
Details	www.lacie.com/uk	www.westerndigital.com	www.formac.com	www.freecom.com	www.maxtorsolutions.com	www.seagate.com
Part code	301017	WDXMS1600	FUR20160-0	28146	STM901603OTABE1-RK / R01E160	ST901603FGA1E1-RK
						

Labs verdict Portable external hard disks

All but one of the portable hard disks in this month's Labs provide 160GB of storage space and come with only a USB Hi-Speed interface. Despite this apparent uniformity, each device has distinctive features that made this group surprisingly tough to judge.

We were impressed by the sturdy and attractive silver design of Freecom's Mobile Drive. It was the fastest portable disk when writing small files, but it proved one of the slowest in all our other tests, although it wasn't too far behind most of its faster USB-connected competitors. However, it's outclassed by its cheaper rivals.

Despite its name, LaCie's Rugged All-Terrain Hard Drive feels rather insubstantial. Its flexible case and removable rubber cover don't feel as tough as Freecom's metal-encased Mobile Drive. The basic backup software isn't much better than using Windows Explorer. It's the only portable disk in this group that's equipped with a 7,200rpm 100GB disk, although it wasn't noticeably faster than the 5,400rpm 160GB disks when connected through USB Hi-Speed. It's much faster when connected using FireWire 400 or 800, though, and FireWire 800 makes it significantly faster than any

other portable disk. Unfortunately, this performance comes at a price. At £1.33 per gigabyte, it's not good value.

You'll either love or hate the brown wedge-shaped design of Seagate's FreeAgent Go. It was the fastest USB portable disk in almost all our tests, but it fell behind very slightly when writing small files. The pre-installed Ceedo software enables you to run specially modified applications, such as Skype and Firefox, on any connected computer without having to install anything on the computer itself. This is useful, but you can get similar results for free using any portable disk (see www.portableapps.com for details). The backup utility doesn't support scheduled, incremental or versioned backups. The FreeAgent is also the most expensive 160GB portable disk here, costing 61p per gigabyte, so it's not good value.

Formac's disk mini is one of the cheapest portable disks in this group with a cost per gigabyte of just 48p. It did well when writing files but was noticeably slower at reading them. It's also the only disk in our group to come without any backup software, so it's not great value when compared with the Western Digital Passport.

Maxtor's OneTouch III Mini Edition has a creaky, plasticky case that doesn't inspire much confidence in its longevity. Pressing the front-mounted button launches the included backup software, although you can substitute your own backup utility if you prefer. The OneTouch was the slowest portable disk here when writing small files, but it was quicker in our other file transfer tests. It's fast overall, but is also one of the pricier portable disks in our Labs at 58p per gigabyte.

Western Digital's Passport has a rubber bottom that prevents it sliding around your desk and a protective flap covering its USB port. It's also the cheapest portable disk in our group at only 47p per gigabyte. It performed reasonably well when reading and writing large files, although it lagged behind the best in the group when writing many small files. With reasonable speeds, a low price and the excellent EMC Retrospect Express backup software included, though, it's our Best Buy.



WESTERN DIGITAL Passport
Portable (Black) 160GB
USB 2.0 Hard Drive

★★★★★



DESKTOP EXTERNAL HARD DISKS



MANUFACTURER	WESTERN DIGITAL	BUFFALO	LACIE	PACKARD BELL	FREECOM	SEAGATE
Model	My Book Premium ES Edition 500GB	DriveStation Combo 500GB	d2 eSATA II 3Gbits Hard Drive 500GB	Store & Save 3500	Hard Drive PRO 3.5in USB 2.0 & FireWire 500GB	FreeAgent Pro 750-GB External Hard Drive
Rating	★★★★	★★★★★	★★★★★	★★★	★★★★	★★★
STORAGE						
Hard disk	Western Digital Caviar SE16 WD5000AAKS	Hitachi Deskstar T7K500 HDT725050VLA360	Hitachi Deskstar T7K500 HDT725050VLA360	Seagate ST3500641AS-RK	Samsung SpinPoint T166-HD501LJ	Seagate Barracuda 7200.10 ST3750640AS
Capacity	500GB	500GB	500GB	500GB	500GB	750GB
Formatted capacity (NTFS)	465GB	465GB	465GB	465GB	465GB	694GB
Price per gigabyte	£0.24	£0.24	£0.24	£0.28	£0.31	£0.25
Disk size	3.5in	3.5in	3.5in	3.5in	3.5in	3.5in
Interface	USB Hi-Speed, eSATA	USB Hi-Speed, FireWire 400	eSATA	USB Hi-Speed	USB Hi-Speed, FireWire 400, FireWire 800	USB Hi-Speed, FireWire 400, eSATA
Power connector	External	External	External	External	External	External
Spindle speed	7,200rpm	7,200rpm	7,200rpm	7,200rpm	7,200rpm	7,200rpm
Cache	16MB	16MB	16MB	16MB	16MB	16MB
Quoted seek time	8.9ms	11.0ms	8.5ms	16.0ms	8.9ms	8.5ms
HD Tach access time	13.5ms	13.5ms	13.2ms	15.5ms	15.9ms	21.6ms
Weight	1.1kg	1.3kg	1.4kg	1.2kg	1.5kg	1.3kg
Dimensions (HxWxD)	180x66x150mm	170x55x205mm	180x54x168mm	43x133x212mm	60x187x159mm	195x85x168mm
BUYING INFORMATION						
Capacities available	320GB, 500GB	250GB, 320GB, 500GB, 750GB	320GB, 500GB	500GB	250GB, 400GB, 500GB	320GB, 500GB, 750GB
Bundled backup software	EMC Retrospect Express HD 2.0	Memio AutoBackup 2.0	LaCie Backup Software 1.5.22.15.17706	Packard Bell Data Secure 4.0	Acronis True Image 8, Freecom Backup Software 2.08, Freecom Hard Drive Encryption 1.1.5.1, Freecom Personal Media Suite 2.5.1.1	Maxtor Memeo AutoBackup 2.0
Price including VAT	£112 inc VAT	£112 inc VAT	£113 inc VAT	£130 inc VAT	£146 inc VAT	£173 inc VAT
Warranty	One year	Two years	Two years	One year	Two years	Five years
Supplier	www.morecomputers.co.uk	www.broadbandbuyer.co.uk	www.europc.co.uk	www.pcworld.co.uk	www.dabs.com	www.dabs.com
Details	www.westerndigital.com	www.buffalo-technology.com	www.lacie.com/uk	www.packardbell.co.uk	www.freecom.com	www.seagate.com
Part code	WDG15U5000	HD-HC500IU2	300976EK	976554	27756	ST307504FPA1E3-RK

Labs verdict Desktop external hard disks

Most of the new desktop external hard disks in this month's Labs test provide 500GB of storage space, but they differ significantly in speed, cost and value.

Packard Bell's Store & Save 3500 hard disk performed reasonably well in all our tests except reading large files, where it was the slowest desktop disk on test. Unfortunately, it can become alarmingly warm to the touch. At 28p per gigabyte, it's also one of the more expensive desktop disks here. It's not a good buy.

Seagate's FreeAgent Pro has a distinctive brown metallic finish. It's the only 750GB desktop disk in the group, and the only disk equipped with USB Hi-Speed, FireWire 400 and eSATA ports. Unusually these ports are located on a proprietary screw-in module, so you should be able to upgrade the drive to use newer interfaces in the future. Unfortunately, the eSATA and USB 2.0 ports are located on a separate module from the FireWire 400 sockets, so you'll need to switch between them if you want to use both USB and FireWire.

Although faster than any of the desktop USB disks when connected over eSATA, the FreeAgent couldn't keep up with the LaCie d2

or the FireWire 800-equipped Freecom Hard Drive. When connected using FireWire 400, it was left behind by the other FireWire 400 desktop disks. At 25p per gigabyte it's good value, but there are faster and slightly cheaper alternatives.

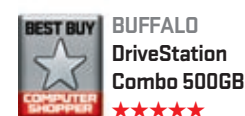
Freecom's Hard Drive Pro is the only desktop hard disk in this group to have USB, FireWire 400 and FireWire 800 ports. It includes a copy of Acronis's True Image 8 disk-imaging software, but this is incompatible with Windows Vista. A pair of front-mounted buttons launches the included backup and encryption utilities, but you can't substitute them with your own preferred software. The Hard Drive Pro feels sturdy and copies files quickly, but it's the most expensive desktop disk in this group at 31p per gigabyte. It performed particularly well using FireWire 800, and it's a good buy if you want to use this fast interface, but it was slower when writing large files over a USB Hi-Speed connection.

LaCie's d2 has a reassuringly heavy metallic case. It's the only hard disk in this group to have no other interface besides eSATA. Its excellent performance in all our tests was similar to that of an internal SATA II disk, although it wasn't quite as fast as Freecom's

Hard Disk when writing small files. It's also surprisingly cheap at only 24p per gigabyte. If you have an eSATA port, it's the one to buy.

Western Digital's MyBook Premium ES performed well over USB in all our tests, but it fell noticeably behind LaCie's d2 when using eSATA, especially when writing large files. It comes with EMC's easy-to-configure Retrospect Express HD backup software. At a very reasonable 24p per gigabyte it's a good-value USB disk, but its eSATA performance is disappointing.

Buffalo's DriveStation Combo costs the same low 24p per gigabyte, but provides both USB Hi-Speed and FireWire 400 ports. It was the fastest FireWire 400 disk in most of our benchmarks, and produced consistently reasonable results over its USB connection. The useful Memeo AutoBackup software automatically backs up your data in the background while you work. With two quick interfaces at a low price, it's excellent value and our Best Buy.



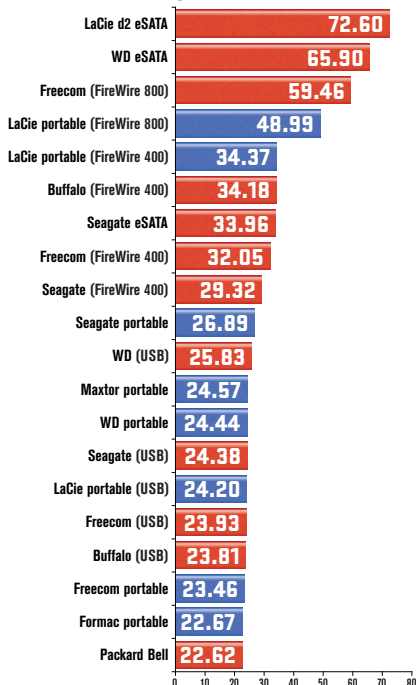
BENCHMARKS

Portable external hard disks

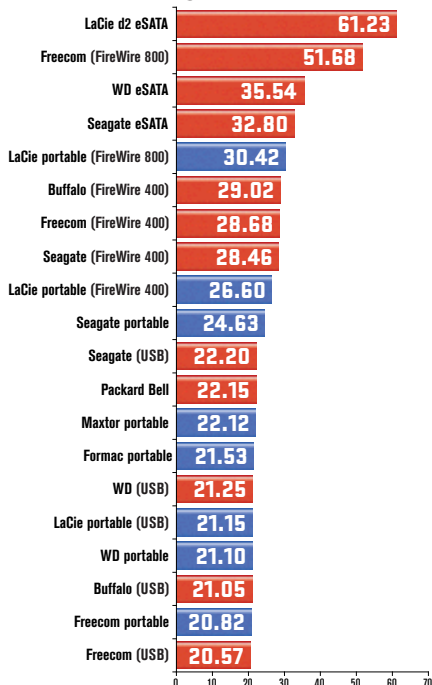
Desktop external hard disks

Performance External hard disks

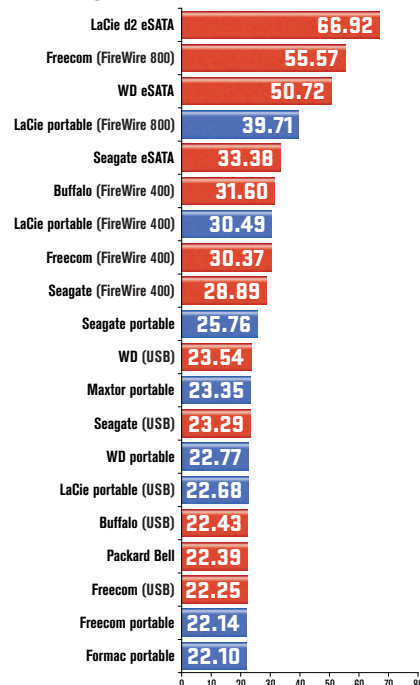
Read Large Files (MB/s)



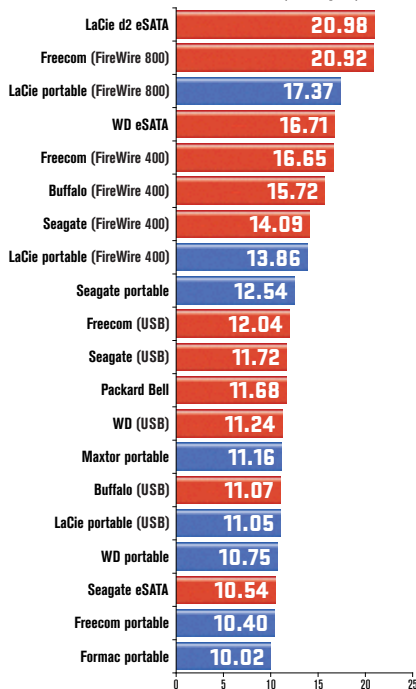
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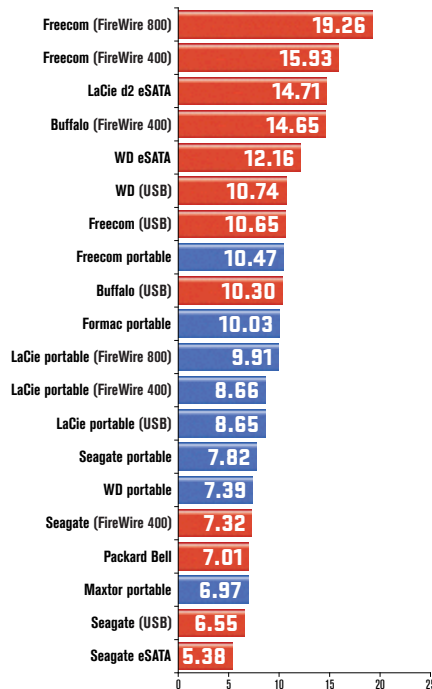
Large Files Overall (MB/s)



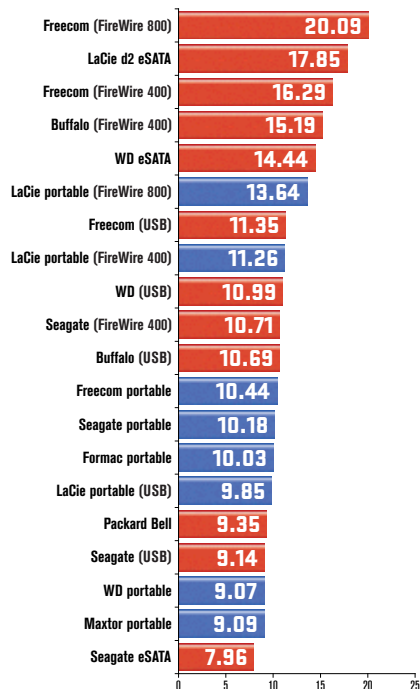
Read Small Files (MB/s)



Write Small Files (MB/s)



Small Files Overall (MB/s)



How we test External hard disks

Hard disks are complicated devices, and there are many factors that determine how fast a disk can transfer files. Cache memory, interface, spindle speed and data density all play a part. This makes it difficult to guess the speed of a disk from its specification.

To find out how quickly each hard disk can read and write files, we use an automated benchmarking script. Files are

copied from memory to the hard disk and back again. We use the computer's memory as the source of the file transfer as it is much faster than any hard disk and ensures that we get the best possible performance from the disk we're testing.

In the first test, a 100MB file is copied to and from each hard disk 100 times. This shows how the disk copes with large files

such as videos. In the second test, a selection of small files totalling 100MB is copied to and from each disk. This shows how quickly small files, such as system files, would be copied during a system backup. Where a disk has more than one interface – such as USB and FireWire – we repeat all our tests using each interface. Finally, we test each disk's average access time using HD Tach.